

Doc Code: AP.PRE.REQ

PTO/SB/33 (07-05)

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PRE-APPEAL BRIEF REQUEST FOR REVIEW

Docket Number (Optional)

2004 P 51343 US

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Application Number

10/840,146

Filed

May 6, 2004

First Named Inventor

Tew, et al.

Art Unit

2814

Examiner

Shrinivas H. Rao

Applicant requests review of the final rejection in the above-identified application. No amendments are being filed with this request.

This request is being filed with a notice of appeal.

The review is requested for the reason(s) stated on the attached sheet(s).

Note: No more than five (5) pages may be provided.

I am the

applicant/inventor.

assignee of record of the entire interest.
See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed.
(Form PTO/SB/96)

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Registration number if acting under 37 CFR 1.34 _____

May 18, 2007

Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required.
Submit multiple forms if more than one signature is required, see below.

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RESPONSE UNDER 37 C.F.R. § 1.116
EXPEDITED PROCEDURE
EXAMINING GROUP 2800

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: *Tews, et al.* Docket No.: 2004 P 51343 US
Serial No.: 10/840,146 Art Unit: 2814
Filed: May 6, 2004 Examiner: Shrinivas H. Rao
For: Semiconductor Structures and Manufacturing Methods

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Pre-Appeal Brief Request for Review

Dear Sir:

Claims 5-18 have been finally rejected under 35 U.S.C. § 103(a) as being unpatentable over Allison and further in view of Hwang et al. Applicants respectfully submit that the claims very clearly recite limitations that are not taught by either of these references whether considered singly or in combination and, therefore, are allowable. In view of the presence of clearly improper rejections based upon error in fact, this application is an appropriate candidate for the Pre-Appeal Brief review process.

The first element of both independent claims 5 and 6 specifically require that the sidewalls of the trench be perpendicular to the surface of the semiconductor structure and disposed in different crystallographic planes. The specifics of this requirement are then set out in the second and fourth elements (see claim 5). Applicants respectfully submit that the rejection of

this claim element is based upon a misrepresentation of the reference and failure to follow proper examination procedures.

In asserting the unpatentability of this claim element, the Examiner admits that Allison does not disclose sidewalls perpendicular to the surface, and relies on Hwang et al. to reject this element. At page 3, third paragraph of the rejection, the Examiner alleges that in figure 4 and at column 3, lines 20 through 42, Hwang et al “describes sidewall portions in a least the 100 and 110 crystallographic planes.” This statement is misleading and contradictory to Hwang et al. It is true that the opening in the epitaxial layer 42 shown in figure 4 does describe sidewall portions of the *neck opening* that are in both the <100> and <110> crystallographic planes. However, as is clearly stated at column 3, line 38, the *vertical* (or perpendicular) sidewalls of the trench lie in the <100> crystallographic plane. More importantly, it is seen that the angle sidewalls that do lie in a different crystallographic plane are not perpendicular to the surface. More simply put, all of the sidewalls that are perpendicular to the surface are in the same crystallographic plane (i.e. plane <100>), not different crystallographic planes, and the angled or sloping sidewalls in the <110> crystallographic plane are not perpendicular to the surface.

Thus, there is no teaching at all that the trench has a first perpendicular sidewall that is in a first crystallographic plane and a second perpendicular sidewall that is in a different crystallographic plane. In fact, the only evidence or disclosure of the orientation of the sidewalls of trench 16 teaches otherwise. For example, column 3, line 38 states that the vertical sidewalls are in crystallographic plane <100>. Further, layer 42 shown in figure 4 of Hwang et al. was epitaxially grown on top of substrate 10. As is known, the epitaxially grown silicon layer 42 will substantially follow the crystalline structure or pattern of the silicon substrate 10. Therefore, the opening in silicon layer 42 shows the sidewalls that are perpendicular to the surface are in the

same crystallographic plane as the surface (i.e., both are in the <100> crystallographic plane). Therefore, as will be appreciated by those skilled in the art the perpendicular sidewalls of the rectangular shaped, trench 16 of epitaxial layer 42 will also be in the <100> crystallographic plane.

The Examiner simply ignored the teaching of the reference and stated it would be obvious to include Hwang et al. "a second sidewall portions of said trench disposed in a second crystallographic plane and said second plane also perpendicular to said surface in Allison's device [SIC]", even though neither reference teaches the limitation. More specifically the sidewalls in the <100> crystallographic plane of Hwang et al may be perpendicular to the surface, but the sidewalls in the <110> crystallographic plane are not.

In addition, independent claim 5 includes the limitation of growing "a layer of silicon dioxide over a first layer of silicon dioxide covering a first portion of the sidewalls and also over a second sidewall portion", wherein the thickness of the layer on the second sidewall portion is substantially equal to the thickness of both the first and second layers of silicon dioxide on the first sidewall portions. It is submitted that neither Allison nor Hwang et al even suggest a second layer of silicon dioxide. Therefore, it is clear that neither Allison nor Hwang et al can disclose or teach the *structural limitation* that the thickness of the layer on the second sidewall portion is substantially equal to the thickness of both the first and second layers of silicon dioxide on the first sidewall portion.

It is therefore respectfully submitted that the limitation of the silicon dioxide layer over another or a first layer is, sufficient to distinguish claim 5 from both Allison and Hwang et al.

Without any reason whatsoever, the Examiner then dismisses the limitation that the trench sidewall portions are perpendicular to the surface as new matter. In the response to the

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previous Office Action dated July 14, 2006, at pages 6 and 7, Applicants explained in detail the support in the original specification and drawings that disclose and clearly teach this limitation. However, the Examiner does not even discuss much less attempt to rebut Applicants' position or arguments. The Examiner simply ignores the clear proof and states that the limitation is considered new matter "for reasons set out above" (presumably in the July 14, 2006 Office Action). Applicants submit that such a cavalier dismissal is improper.

Therefore, it is submitted that there is ample disclosure in the original specification and drawings to support the claim limitation that the sidewall portions are perpendicular to the surface, and that the Examiner's position that such a limitation is new matter is absolutely without any basis.

Finally, the Examiner dismisses the clear structural limitations of the last element of claim 5 because some functional limitations are included in the claimed element and then alleges in the Advisory Action that the Applicants admit that the claims do not comply with proper device claim format. Applicants admit no such thing and find the Examiners cavalier treatment of a good faith effort to explain their position objectionable. More specifically as was explained in detail to the Examiner at page 11 in the March 5 response, even ignoring all of the functional related material in the last element of claim 5, there are still structure limitations sufficient to patentably define over both Allison and Hwang et al. For example, the structure portions of the last element of claim 5 requires a

"a second layer of silicon dioxide . . . A...on both said second sidewall portion . . . B... and on said first layer of said silicon dioxide material . . . C...the thickness of said second layer of silicon dioxide on said second sidewall portions is substantially equal to the thickness of both said first and second layers of silicon dioxide on said first sidewall portions."

The above quote is the last element of claim 5 with all of the methodology language indicated by A, B, and C, removed. Clearly, there are still significant structural limitations remaining. The complete portions of the claim element not included above are A) "grown"; B) "at a second rate"; and C) "at a rate slower than said second rate such that". It is submitted that the inclusion of the A, B and C portions of the claim was proper, and that, the Examiner has no right to ignore the structural limitations set out in this element regardless of what he chooses to do with the methodology language. Neither Allison nor Hwang et al. teaches these structured limitations, much less the functional limitations, and the Examiner has made no attempt to show that they do.

Further, the Examiner has made no explanation whatsoever as to what authority was used to cancel and ignore the structural portions of the claim element.

In view of the limited nature of this paper, Applicants have not raised all grounds of arguments. Rather, Applicants have attempted to focus on one clear error in the rejection. In the event of a full appeal, Applicants will raise additional arguments.

Respectfully submitted,

18 May 2007
Date

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